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R E P O R T
of the
SEVENTH NORTHEASTERN CORN IMPROVEMENT CONFERENCE

New York City, New York
January 25-26, 1952

Reported by
Merle T. Jenkins, Secretary



Division of Cereal Crops & Diseases
Bureau of Plant Industry, Soils, and Agricultural Engineering
Plant Industry Station, Beltsville, Maryland
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REPORT OF THE SEVENTH NORTHEASTERN CORN IMPROVEMENT CONFERENCE

New York City
January 25-26, 1952

Reported by Merle T. Jenkins^{1/} Secretary

AFTERNOON MEETING, FRIDAY, JANUARY 25, 1952

The meetings of the Seventh Northeastern Corn Improvement Conference were held in the Barbizon Plaza Hotel, New York City. Arrangements for the conference were made by R. G. Wiggans, Conference chairman. The conference was attended by a total of twenty research workers representing the Agricultural Experiment Stations of Connecticut, Delaware, Maine, Massachusetts, Maryland, New Hampshire, New Jersey, New York, Ohio, Pennsylvania and West Virginia, the Brookhaven National Laboratory and the U. S. Department of Agriculture.

The afternoon session was called to order by Chairman R. G. Wiggans. at 1:20 p.m. Dr. Wiggans outlined the general purpose and the program of work for the present meeting. He then asked M. T. Jenkins to discuss the progress made in the utilization of hybrid corn in Europe. Dr. Jenkins outlined the hybrid corn programs sponsored in Europe by FAO, ECA and OEEC. FAO has sponsored four international hybrid corn conferences in Europe, and cooperative tests of a wide range of American hybrids. A fifth conference is scheduled to be held at Zurich, Switzerland, February 5 to 9. ECA has sponsored seed purchase programs in several countries to permit extensive trials of American hybrids by European farmers. OEEC in cooperation with ECA has sponsored two extensive surveys of the progress and possibilities of hybrid corn in Europe to serve as guides for future activities. All programs have been highly successful and hybrid corn seems definitely established in Europe to stay. Dr. Jenkins also showed a number of kodachrome slides taken on trips to Europe in 1947 and 1949.

Chairman Wiggans next called for reports from some of the standing committees.

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Report of the Committee on the Uniform Tests
of Double Crosses

H. L. Everett presented the report of this committee. A uniform test of double crosses of U. S. 13 maturity was conducted in 1951 at three locations. The data are presented in summary form in table 1.

Table 1. Summary of the 1951 uniform tests of double crosses of U.S. 13 maturity. Cooperators: Conn. (Planted May 21; Harvested Oct. 24); New Jersey (Planted May 17); and Delaware. Data from three tests averaged

Designation	Entry Pedigree	Yield Rank	Yield *Bu/A	% Mois- ture	% Broken	% Stand	% lodg- ing	Median silk date
W.Va.#1363	7x07 .Hyx12	+1.70	94.3	23.8	53	90	4	78
N.E.8824	C102xC103.WF9xK155	+1.50	92.9	22.8	37	92	2	79
N.E.7815	C102xC103.WF9xOh7A	+1.38	88.6	22.9	39	95	2	79
Experimental	Pa82Ax86 .56x29	+1.06	87.8	22.3	21	91	6	76
W.Va.#1461	B3x5 .7x15	+0.78	88.5	24.4	66	94	7	79
N.E.8862	C102xWF9 .C103xHy2	+0.42	83.0	22.6	46	90	0	78
N.E.8854	C102x38-11.C103xK155	+0.26	82.6	24.4	53	95	4	81
W.Va.#1301	7x8 .HyxT92	+0.15	81.0	26.6	62	91	2	78
N.E.8835	C102xWF9 .C103xK155	+0.11	81.2	22.7	35	92	6	78
N.E.8814	C102xC103.38-11xK155	+0.10	81.8	22.9	45	92	3	80
Ohio C47	WF9xHy .Oh40BxL317	+0.09	79.5	24.3	43	93	8	79
Experimental	Pa56xPa29.Oh43xPa70A	+0.06	81.7	22.6	35	89	4	76
Conn.830	WF9xP8 .Oh40BxI159	+0.06	81.0	23.3	47	93	4	77
W.Va.#1313	WF9x38-11.HyxK155	+0.01	77.9	25.0	31	90	9	80
Conn.875		-0.01	70.8	26.3	40	86	10	80
Experimental	WF9x38-11.Oh43xPa70A	-0.05	78.1	22.9	41	92	1	76
Experimental	Pa56xPa29.Pa70	-0.14	79.8	22.6	32	92	3	77
N.E. 7814	C102xC103.WF9x38-11	-0.17	77.4	24.1	36	89	3	79
Experimental	Pa83HxPa86.56x29	-0.18	78.3	23.1	26	88	6	77
Experimental	WF9x70 .Pa87AxPa86	-0.19	78.9	25.3	24	93	2	77
Conn. 831	WF9xP8 .HyxC103	-0.19	78.6	27.8	38	86	14	78
U.S.13	WF9x38-11.HyxL317	-0.24	79.2	23.7	53	96	6	79
Conn. 860		-0.44	76.3	26.5	35	95	4	78
Ohio C54	Oh26xHy .Oh43 xOh45	-0.44	77.5	22.9	24	90	2	74
Conn. 870	WF9x38-11.HyxC103	-0.78	70.2	25.4	31	86	1	79
W.Va.#1224	WF9xHy .P8x38-11	-0.82	74.6	25.2	26	95	11	79
Ohio W64	Oh51AxWF9.Oh43xOh45	-0.87	73.3	22.2	23	89	2	71
Pa. 840		-0.88	73.5	25.8	45	90	5	78
Experimental	WF9x51A .W22xPa70	-1.08	71.5	20.4	32	94	1	73
Ia. 4059	WF9xHy .L289xI205	-1.56	64.2	24.0	52	78	5	76

L.S.D.
at .05

1.25 12.6
*Bu/A at 15.5%
Moisture Content

Following Dr. Everett's report there was considerable discussion of the results and usefulness of the test, particularly with reference to the eligibility of certain entries for the regional "Eastland" designation. Under present procedures promising new hybrids usually get into commercial production under state designations before they have completed the regional testing needed to make them eligible for an "Eastland" designation. It seems evident that testing and naming procedures need to be reviewed and modified so as to permit assigning "Eastland" designations after the limited commercial production required in the delayed release program. It was suggested that new hybrids might be carried under "Experimental" numbers until this requirement has been met.

Attention was called to the fact that several of the high yielding double crosses in the uniform test were too tall and too high eared to be satisfactory for commercial production. Methods of producing experimental doubles better suited to commercial requirements were discussed in detail. There was a definite feeling that it might be more efficient to test 3-way crosses than single crosses in those maturities where outstanding seed-parent single crosses are available. These established seed parents would be used as the testers.

Reports of the Committee on the Uniform Tests
Of Single Crosses

H. M. Yegian reported for the committee on tests of W240 maturity. No crosses of this maturity were produced for testing in 1952.

L. L. Huber reported as follows for the committee on tests of W355, W412 and M15 maturities.

W355 Maturity. No crosses of this maturity were produced for 1952 tests.

W412 Maturity. Seed of single crosses sufficient for about 12 tests was produced by H. M. Yegian and L. L. Huber. Tests for the coming season were assigned as follows:

Pennsylvania	2 or 3
New York	2
Massachusetts	2

M15 Maturity. Seed of single crosses sufficient for 7 to 9 tests was produced by R. G. Wiggans and L. L. Huber. This seed was assigned for 1952 tests as follows:

Pennsylvania	2 or 3	Connecticut	1
New York	2	Ohio	1
W. Virginia	1		

J. L. Cartledge reported for the committee on K24 and Ia.4059 maturities. No test crosses were produced for either of these maturities.

R. G. Rothgeb reported for the committee on U.S. 13 and Ill. 448 maturities. No test crosses of Ill. 448 maturity were produced.

U.S. 13 Maturity. Single-crossed seed sufficient for about 6 tests was produced among the following 10 inbred lines.

Pa83C	Pa92D
Oh45	J47
WF9	J7-269
Oh29	Hy2
38-111B	C107

Seed for 1952 tests of these single crosses was assigned as follows:

Maryland	1	New Jersey	1
Delaware	1	Pennsylvania	1
Connecticut	1		

Report of the Committee on Uniform Tests
of Field Corn Inbreds

L. L. Huber reported that about 75 early inbred lines were grown for preliminary screening at Pennsylvania and New York. Dr. H. L. Everett summarized the observations from the two locations and selected the following lines as appearing most attractive:-

Wisconsin	WH, W9, Wml3R, W22, W153R	South Dakota	SD105
Ohio	Oh26	North Dakota	ND167
Minnesota	A218, A375, A334, A221	Illinois	R53

These inbreds were above average in some or all of the following attributes: % aphids, Mg deficiency, tassel type, drought resistance, root lodging, standability, and reaction to 2-4D. Their relative maturities have been determined and the data are available upon request to the New York Station. Later inbreds were observed at the Maryland Station where they could receive a more adequate appraisal.

In 1952 New York and Pennsylvania plan to produce seed for an all-combination single cross trial with the following inbreds: A218, A375, A221, SD105, and R53. The following in-conference inbreds will also be included:

NY3, Pa32D, Pa11, and PaEB172.

New York still is serving as procurement agent for the Northeastern Corn Improvement Conference. Requests for seed of promising out-conference inbreds for screening in inbred nurseries should reach Ithaca so as to allow ample time for coordination and communication with the mid-west stations.

STATION REPORTS

CONNECTICUT

CONNECTICUT AGRICULTURAL EXPERIMENT STATION, New Haven

D. F. Jones. The inbred nurseries of both sweet corn and field corn are being continued in which many of the standard inbreds are compared each year with new selected lines in a wide range of maturities.

Tests of sweet corn and of field corn hybrids were made at both Windsor and Mt. Carmel, as well as the Regional Uniform Double Cross comparison in the U.S. 13 maturity. The results of these trials are given in our annual corn report.

In sweet corn further studies on the vestigial glume character have been made. This dominant gene is being incorporated in P39 to be used as a seed parent, selecting for increased pollen production while at the same time keeping the ears completely glumeless.

In field corn a number of selected lines have been placed under a handicap by incorporating the dominant Paggd gene. By maintaining this dominant gene in the heterozygous condition the plants are kept in a greatly reduced state of growth and reproductive ability. Only a few plants can survive at all. After several generations of selection the normal plants will be recovered and compared with similar lines not handicapped in this way.

The effect on heterosis of single dominant marker genes and neighboring regions on the chromosomes is being tested in backcrosses after many generations. The dominant markers selected for this study: yellow endosperm, red cob and non-glossy seedlings, have no appreciable effect on vigor in themselves.

A number of standard lines of field corn have been found to have a high sugar content in the juice of the stalk. Of the lines examined so far Cl03, Iowa Tr(Lg), W22, P8, Bl0, N6, Cl.7 and Oh45 have a juicy pith in the lower internodes of the stalk with considerable sugar in this juice at maturity before frost. Some lines have a juicy pith that is not sweet. Ind.38-11 is an example. Single crosses made between a number of these high sugar lines all show a reduction in percent of sugar compared with the inbreds, but an increase in the total amount of sugar due to the much larger stalk weight. The high sugar may have value in ensilage corn. It

seems to be associated with desirable stalk qualities and some disease and insect resistance.

A fourth type of cytoplasmic sterility found in a yellow flint variety of corn introduced from Turkey is being transferred to the same inbreds that are cytoplasmic sterile from three other sources, namely, - Mexican June, Teopod and Tropical Flint from Brazil. Preliminary results indicate that there are some differences in the pollen abortion from different sources.

In 1951 some 1000 acres of seed production throughout the country were made on pollen sterile seed parents and a greatly increased acreage will be grown in 1952. Many of the standard seed parent inbreds have been converted to the Mexican June and Teopod types of sterility and have been maintained in a completely pollen sterile condition for several generations.

The term "semi-sterile hybrids" used in the 1951 report is not appropriate since this is used to describe the 50 percent abortion of both microspores and megaspores resulting from chromosomal aberrations. In cytoplasmic steriles there is no abortion of megaspores. There is a partial restoration of pollen production in nearly all double crosses but this is usually not sufficient to insure full grain production. For the present it is necessary to mix normal seed produced in the usual manner with the seed produced on sterile seed parents in whatever amounts are needed to supply full pollination. Tests have shown that under average conditions one fourth normal plants is adequate.

Yields of seed from the sterile single crosses have been appreciably more than the yields of the same fertile seed parents detasseled. This may be due entirely to the fact that no leaves are lost as is usually the case when the tassels are pulled. However, the abortion of the pollen may divert nutrients to the ear and may well be a factor in increased seed production, but this has not been proved.

Genes are available to restore pollen production completely in the final crop grown for grain. These genes are being transferred to a number of widely used pollinators.

DELAWARE

DELAWARE AGRICULTURAL EXPERIMENT STATION, Newark

F. B. Collins, reported that no corn breeding work was in progress at the University of Delaware but research is being conducted on the fertilization of corn. Much stalk breaking has been observed under some

conditions. So far as could be ascertained in one test conducted last year there was no correlation between fertilizer treatment and stalk breaking.

MAINE

MAINE AGRICULTURAL EXPERIMENT STATION, Orono

R. M. Bailey reported that early maturity is of primary consideration in grain production in Maine. Dent hybrids of W240 maturity have been tested along with dent x flint crosses of similar maturity. This year some 15 dent x flint crosses outyielded about 20 early dent crosses.

The program of sweet corn improvement is being continued along the same general lines as in the past.

MASSACHUSETTS

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION, Amherst

H. M. Yegian indicated that primary effort in the breeding work is directed toward the development of early maturing hybrids for grain production.

MARYLAND

MARYLAND AGRICULTURAL EXPERIMENT STATION, College Park

R. G. Rothgeb. The program of work at the Maryland station was outlined in last year's report. Since little change was made during 1951, a very brief statement should suffice at this time.

Drought limited the breeding efforts at College Park in both field corn and sweet corn. Mid-season and late plantings fared badly. A saturated soil during germination and early growth was responsible for a poor stand of field corn inbreds. The drought that began when the plants were about knee-high continued well beyond the pollination period. Many plants developed only a few seeds. Several early sweet corn hybrids did not produce a single good ear in a row of 30 plants. Under these conditions, very little hand-pollinated seed was produced. Some observations of importance were made on relative plant vigor and drought tolerance.

Some of the outlying double cross tests had ample moisture. Stalk rot was excessive in one test where much mineral fertilizer was used. In this test stalk breakage ranged from 29 to 90 percent with the majority of entries above 50 percent. Many farm fields in the southeastern part

of the state showed excessive stalk rot also. Poor fertility balance - nitrogen in excess - may have been a major cause. In tests to date the double cross hybrids U.S. 505, and Conn. 870 have rated well for stalk quality. From our observations in 1951 it would appear that stalk quality, however, continues to be a major consideration in hybrid improvement in Maryland.

NEW HAMPSHIRE

NEW HAMPSHIRE AGRICULTURAL EXPERIMENT STATION, Durham

G. M. Dunn reported that no corn breeding investigations are in progress at the New Hampshire Agricultural Experiment Station. Corn variety tests are being conducted under the supervision of Professor L. J. Higgins.

NEW JERSEY

NEW JERSEY AGRICULTURAL EXPERIMENT STATION, New Brunswick

Sweet Corn Breeding Investigations

R. S. Snell reported that all of the objectives listed in last year's report -- resistance to bacterial wilt and smut, higher production, better quality and progressively earlier maturity are still being pursued in the New Jersey breeding program.

Successful Western production of seed of Experimental Hybrid #101 is apparently nearer than at this time last year.

Western production of earlier maturing Experimental Hybrid #106 is being considered.

Convergent improvement is being used as one means of improving inbreds of successful hybrids for use in large scale seed production, apparently with some degree of success.

Field Corn Breeding Investigations

J. C. Anderson. The corn breeding program at the New Jersey Station has about six separate phases at present. First, but not necessarily most important is the development of male sterile lines both of the genic and cytoplasmic types. Last year about 15 lines were utilized in an attempt to transfer the cytoplasmic sterility. Among about 200 new selections, one line was found to have male sterile plants a ratio of 1:3 and it is assumed that this is probably a genic type. The cytoplasmic lines were taken to Florida and advanced a generation there.

The phase of developing two-eared strains which it is assumed will have greater adaptability has continued but will need several more generations in order to have the character fixed. Some work is being done also on the transference of partial dwarf characteristics to about 10 of our standard inbred lines.

Our major effort, however, is placed on a breeding program to study Giberella stalk rot, its resistance and its inheritance pattern. I have a graduate student, C. C. Stults, working on this program and 150 lines including inter-and intra-line crosses were sent to Florida and selfed there. These segregating populations will be planted out and observed this coming year.

From a strictly practical standpoint, I have finished the second year of a substitution program in which about 120 new double crosses were made substituting one inbred at a time in our 3 New Jersey hybrids. Out of this group have come approximately 15 very promising new combinations.

At the insistance of farmers we are working on new hybrids of approximately the Iowa 939 maturity or slightly earlier. I am sure there will never be much of a sale for these but the occasional few who want it are rather vociferous.

In general, the corn breeding program for the past year came along with good results due to the fine cooperation of the weather. The portion which directly concerned the Northeast Corn Improvement Conference did especially well I am very happy to report.

NEW YORK

AGRICULTURAL EXPERIMENT STATION at Cornell University, Ithaca

H. L. Everett. An inbreeding and selection program in several open-pollinated varieties of field corn initiated in 1950 was continued and several hundred S_1 progenies were observed. Three-way crosses of the S_0 lines on single crosses used extensively in New York were also noted. Reciprocal top crosses between selection stocks in the varieties Cornell 11 and Golden King were also observed. Promising lines were selfed and will be grown in selection nurseries in 1952.

Three rather new and diverse breeding projects were commenced or continued in 1951. Dr. Jones' cytotosterility sources were used in a paired progeny backcross program. The object being to sterilize the most widely used of the New York inbreds, and incidentally, to isolate restorer inbreds if any are to be found among our lines. A program utilizing the diminutive mutant form originally described by Dr. Singleton was extended. The ultimate goal being the establishment of reduced inbreds and production of vigorous reduced field corn hybrids.

A study of Dr. Sherret Chases' monoploid technique is also in progress and the first monoploid selections are now growing in the Cornell greenhouses. The objective here is to produce completely homozygous inbreds which are well adapted to New York environmental conditions. Breeding experiments with these three undertakings will be continued this year.

NEW YORK STATE AGRICULTURAL EXPERIMENT STATION, Geneva

D. W. Barton. The sweet corn breeding program has as its primary objective the development of quality selections for processing with high yield (of both field and cut corn), and maturing somewhat in advance of the main processing season. At present, a large number of new inbreds are being evaluated and will be tested for both general and specific combining ability in combination tests during the next few years. This year is the first in which cytoplasmic sterility and vestigial glume will be incorporated into the breeding material.

In conjunction with the breeding program, evaluation of present commercial hybrids is being made at freezer, whole kernel, and cream style stages of maturity. The data include field yield, cut corn yield, cutting percentage, average ear weight, percentage pericarp, moisture, and sugar. Use of the heat unit system permits a more accurate comparison of the rates of gain or loss of the measured characteristics.

OHIO

OHIO AGRICULTURAL EXPERIMENT STATION, Wooster

G. H. Stringfield. It has seemed that more vigorous zygotes might accumulate more food in the embryo and possibly also in the endosperm than less vigorous zygotes at approximately the same location on an ear. Seed from one area approximately $1\frac{1}{2}$ inches from the butt was first separated into large and small for the 1950 planting. Fifty pairs of rows were planted; one row from large seed, one row from small seed. For the 1951 planting large seed was taken from plant selections coming from the large seeds and small seed was taken from plants selected from the small seeds. Each lot of seed was planted in a separate row and one plant selection was made from each row. The cultures were from (M14 x CI-187-2) x Oh45.

A similar division of seed was made for the 1951 planting using S₁ ears from the composite representing recovered Oh26 lines.

In 1951 two open-pollinated plants from each row were harvested. The ears were dried, ear weights taken, and average kernel weights from mid-ear areas were taken. Comparisons of the progeny of large versus small seeds indicate a definite tendency of the plants from large seeds to silk earlier and yield more than the plants from small seeds.

PENNSYLVANIA

PENNSYLVANIA AGRICULTURAL EXPERIMENT STATION, State College

Field Corn Breeding Investigations

L. L. Huber. Drought conditions as severe as during July and August of the past season do not often occur. At State College, for example, we experienced the driest season in 65 years.

Nursery material as well as single and double crosses showed wide differentials in drought susceptibility. One of the most interesting observations of drought susceptibility in double crosses was made where corn was planted with an application of 1000 pounds of 10-10-10 and 500 pounds of sulphate of ammonia plowed down and 450 pounds of 10-10-10 in the row. As might be expected the corn showed no evidence of nutrient deficiencies. Most of the hybrids showed little or no stalk rot. Insect damage was negligible. Ears showed typical drought symptoms and these symptoms were associated with yield.

In the State College nursery some inbreds failed to ear due primarily to drought. At Hershey every hybrid with Ind.38-11 could be easily identified because of drought damage to the ears. On the positive side it was evident that we can make hybrids that are relatively resistant to drought conditions.

The importance of the drought factor should not be overlooked. In Pennsylvania, at least, drought conditions occur every year in some areas. The big problem is how to satisfactorily read drought damage when other factors complicate the interpretation.

Corn Disease Investigations

C. C. Wernham. The corn/^{disease}program at Penn State has largely been an exploratory expedition into the realm of producing disease resistant inbreds on a 3-acre nursery basis. The program is a complete one except for ear rots. A wide range of maturity levels calls for discretion in interpretation. Climatic factors limit expression of Helminthosporium maydis and Xanthomonas stewarti. There is a tendency to judge the disease performance of early lines on the same basis as later maturing ones - the earlier lines suffering by comparison.

Corn is planted in cold wet soil 10 - 14 days earlier than usual. Rootrot organisms are planted with the seed. Surviving plants - thinned where necessary, undergo successive inoculations with smut, leaf blight and stalk rot organisms. Selections are made on an individual plant total disease record. 10-12% of nursery plants survive the test and are harvested. Surviving progeny are turned over to agronomy after F₃ or F₄ in the disease nursery.

There are difficulties. Early planting leads to grassy plots requiring much hand labor in May and June. Inbreds later than Hy are likely to be frozen out. Late inbreds do not get a very severe test for stalk rot. The gene frequency for resistance to Helminthosporium turcicum is low. In blight (resistant x susceptible) crosses, experience has shown that F_1 's with the least blight produce more resistant progeny. NC34, K175, K155, Ky114, A71, C125, CI.23, J7-6A have been used as blight resistant parents. To date NC34 leads in recovered progeny, but K155 leads in general combining ability. A second cycle of breeding is started using lines surviving top-cross tests.

A new series of crosses using C103 and resistant lines from open-pollinated corn is being processed. Recovered lines of WF9, 38-11, Hy, L317 and K64 supplied by Dr. Jenkins were used to make new crosses in 1951. Lines of later maturity are to be made by crossing Northeastern lines of high resistance and general combining ability with Southern lines with equivalent rating and inbreeding the F_1 without benefit of epiphytotics in our longer season areas.

WEST VIRGINIA

WEST VIRGINIA AGRICULTURAL EXPERIMENT STATION, Morgantown

J. L. Cartledge reported that the breeding work is limited both by available personnel and facilities. Selection experiments with the inbred line WV12 have been in progress for several years and are yielding some interesting results. Another project is concerned with the testing of silage hybrids with high sugar in the culms. A considerable amount of the breeding and testing is directed toward the development of hybrids of about Ohio M15 maturity.

Conference recessed at 6:25 for dinner.

EVENING MEETING, FRIDAY, JANUARY 25, 1952

Chairman Wiggans called the meeting to order at 8:15 p. m. and then turned the chair over to Dr. J. L. Cartledge, Vice Chairman of the Conference. Dr. Cartledge indicated that the first item on the program was a discussion of the following topic.

Recent Developments in Cytoplasmic Sterility

H. L. Everett discussed recent investigations with three cytoplasmic male steriles now under consideration for commercial use. These are the U.S.D.A. (teopod) sterile, the Texas sterile, and the Kys sterile.

D.F. Jones discussed the commercial use of male sterility and various reactions of different steriles and different pollen restoring genes.

Following these presentations there was a lively discussion of the various phases involved in the use of cytoplasmic male sterility in the production of hybrid corn seed without detasseling.

R. S. Snell

MOVED: That the Chairman appoint a committee to consider policies on the uniform tests.

Seconded and passed.

The following committee was appointed by Chairman R. G. Wiggans.

D. F. Jones, Chairman

H. L. Everett

R. G. Rothgeb

L. L. Huber

M. T. Jenkins

Meeting adjourned at 10:00 p. m.

MORNING MEETING, SATURDAY, JANUARY 26, 1952

The meeting was called to order by Chairman R. G. Wiggans at 9:30 a. m., who called for reports of the remaining standing committees.

Report of the Committee on General Policy for Regional Testing of Inbreds and Hybrids

Inbreds to be tested are to be given a preliminary screening before being used in combination tests. This screening shall include the notes as given on page 10 of the 1951 Report, and in addition should include observations on ear rots as well as stalk rots, and the results of any inoculation tests for diseases and insects, and any tests for chemical treatment such as 2-4-D that may be desirable.

The testing of inbreds may be made in an All Combination Test, a Restricted Combination Test (as outlined in Conn. Bul. 532), or tests with specially selected inbreds or single cross seed and pollen parents.

All seed included in tests should be uniformly seed treated as far as possible. All tests made with hand pollinated seed should be designated.

H. L. Everett
L. L. Huber
M. T. Jenkins
R. G. Rothgeb
G. H. Stringfield
D. F. Jones, Chairman

The discussion following the committee report presented by Dr. Jones was concerned with the use of hand-pollinated vs. open-pollinated and commercially processed seed in yield tests. It finally was decided that hand-pollinated seed should be so labelled in the reports of tests. There also was a discussion of procedure for collecting seed for the observation tests of inbred lines. In this connection it was decided that H. L. Everett should continue to collect seed of the lines and that the late inbred lines would be forwarded to R. G. Rothgeb for observation in Maryland.

Membership of the various committees on the uniform tests of hybrids were reviewed and revised. The revised membership is shown on page 24 of this report.

The present procedure for testing double crosses predicted from tests of single crosses was discussed. It was felt that more effort should be concentrated on the testing of double crosses involving good seed parents. Predicted double crosses that are made up for testing should in all cases involve one single cross suitable as a seed parent for commercial seed production.

Following the discussion it was

MOVED; That the committee report be adopted.

Seconded and passed.

Report of the Committee on Eastland Hybrids

1. All data from yield tests and other pertinent information are to be submitted to the committee by the state sponsoring the hybrid to be registered.

2. The pedigrees are to be given and the inbreds made available to all competent seed producers requesting seed stocks.
3. Entries are to be seconded by one or more states other than the original sponsor.
4. There must be a minimum of three years test, one year of which may be the prediction from a combination test of the inbreds making up the pedigree.
5. New hybrid combinations are to be designated as Regional Experimental Hybrids or State Experimental Hybrids until accepted by this committee and given an Eastland number.
6. The naming of any new hybrid should clear through the naming committees of other regions to avoid duplication of named hybrids.
7. These qualifications are to replace previous requirements.

L. L. Huber
R. G. Rothgeb
D. F. Jones, Chairman

Following Dr. Jones' report it was

MOVED: That the committee report be adopted. .

Seconded and passed.

Report of the Committee on Cold Testing

Cold testing in the northeast started with the sweet corn breeding program in Connecticut and results were reported in publications of 1948-49. O. H. Pearson of Eastern States Farmers' Exchange "Seed service" at Feeding Hills, Mass., and plant pathology at the Pennsylvania State College of Agriculture at State College, Pa., have followed up this earlier program. Progress reports of both these follow-up programs are available.

At Penn State the program is divided. Agronomy uses the latest methods and information available to screen established and experimental inbreds and hybrids. Hoppe's paper towel technique is used with field soil. For our purposes this method appears to be the most usable of the many methods described.

In the plant pathology program, cold testing was initiated under field conditions in 1948 and progeny testing has shown the soundness of this program in selecting cold tolerant lines and sub-lines. Recent acquisition of two refrigerators will allow us to pre-screen field selected ears from last year's nursery for this year's planting. For previously unselected characters, we look upon corn lines in any stage of inbreeding as populations amenable to selection pressures.

Strains of Gibberella, Diplodia collections and Pythium spp. are grown on cooked sterilized grain, air dried, mixed and planted with the seed about two weeks in advance of normal corn planting in an effort to insure cold wet soil conditions. Surviving plants are subjected to the full disease treatment and selfed. Beginning with S_0 or F_1 material most lines seem to become quite stable by F_4 and exhibit a minimum of segregation. Planting organisms with the seed increases the expression of premature dying of mature plants and facilitates elimination of stalk rot susceptibles.

Fundamentally we are investigating the response of hybrids to various seedling pathogens alone and in combination under various edaphic conditions. Field records of limited duration show that inbreds on the basis of survival from Gibberella and Diplodia give a remarkably good record when subjected to Pythium spp.

Wm. Haltiwanger, one of our agronomy graduate students, is pursuing these ideas for a thesis project. With grain-cultured organisms in stock the experimental design is as follows:

A. Treatments

- | | |
|---|--|
| 1. None | 5. <u>G. zeae</u> + <u>Pythium</u> spp. |
| 2. <u>Pythium</u> spp.
<u>P. debaryanum</u> , <u>P. ultimum</u>
<u>P. irregulare</u> , <u>P.</u>
<u>arrhenomanes</u> | 6. <u>D. zeae</u> + <u>Pythium</u> spp. |
| 3. <u>Gibberella zeae</u> | 7. <u>G. zeae</u> + <u>D. zeae</u> |
| 4. <u>Diplodia zeae</u> | 8. <u>Pythium</u> spp. + <u>G. zeae</u> + <u>D. zeae</u> |

4 collections

B. 6 hybrids* previously cold tested and ranked as follows:

- | | | |
|----------------|-----------------|--------------|
| a) susceptible | b) intermediate | c) resistant |
| b) | c) | d) |

*Courtesy Pioneer Hi-Bred Corn Company

C. 4 media

- | | |
|-------------------------------|--------------------|
| a. washed sand | c. corn field soil |
| b. sterilized corn field soil | d. vermiculite |

D. 3 temperature ranges - 45° F., 50° F, and 55° F.

E. 3 incubation periods - 7, 10 and 14 days.

F. 2 randomized replicates per experiment.

G. Data are taken on total emerged seedlings after 7 days in a warm room.

Note: Refrigerator space limits us to one incubation period at one temperature level per run.

Dr. Richard Van Norman, physiologist in the Botany Dept., came up with a new method of rapid examination of kernels for mechanical injury which he believes is superior to the iodine-potassium iodide method. The procedure is as follows:

Make a 0.1 per cent solution of Light Green S.F. Cover seeds with solution and place in an aspirating bottle or flask. Evacuate for two minutes until large bubbles form and disappear. Remove seed and rinse at least once in cold water. Seeds may be examined wet or dry - at least 6 months later.

Preliminary tests indicate that germination is not adversely affected. More injury could be detected by infiltration of dye than by examination of untreated seed by 10x binocular. This finding is particularly true of breaks in the region of the germ. Four or five replicates of 50 seed samples of commercial hybrids were used to establish the preliminary data.

1948 Haskell, G. Effect of low temperatures on the germination of inbred lines of sweet corn. Science 107:150

1949 _____ and W. R. Singleton. Use of controlled low temperature in evaluating the cold hardiness of inbred and hybrid maize. Agron. Jour. 41:34.

1951 Wernham, C. C. Cold testing of corn, a chronological and critical review. Pa. Agr. Expt. Sta. Progress Report 47.

1952 Pearson, O. H. Breeding for cold resistance in corn. Paper read before Pennsylvania Farmers Association at Pa. State College, Jan. 10. Eastern States Farmers' Exchange, Inc., West Springfield, Mass.

R. G. Wiggins
H. Everett
C. C. Wernham, Chairman

After a brief discussion of the report it was

MOVED: That the report be accepted.

Seconded and passed.

Report of the Sweet Corn Committee

In 1951 Connecticut, Maine, Maryland and New Jersey cooperated in conducting observation tests on 12 experimental hybrids submitted by three of the cooperating stations. Reports were received from Maine, Maryland and New Jersey. The latter station had a good season, and as a result was able to submit a complete report with 11 categories of data. Reports from Maine and Maryland were much less complete.

The accompanying table gives the most important data obtained.

The committee members present decided to plan cooperative work in 1952 in accordance with the response to a questionnaire to be mailed to committee members well ahead of planting time.

Robert S. Snell of New Jersey had the privilege of attending the meeting of the North Central Sweet Corn Breeders last November. His report on this meeting is quoted below, and made a part of this committee's report to the N. E. Conference.

"Northeastern sweet corn breeders were invited to attend the first meeting of the Sweet Corn Sub-Committee of the Technical Corn Committee of the North Central States at Chicago on November 30, 1951.

"It was decided at the November meeting to invite the sweet corn breeders of the Northeast for a joint meeting next year. This meeting will be held in connection with meetings of the American Seed Trade.

"Sweet corn breeders of the Northeast should consider attendance on such a joint meeting since it might eventually lead to national meetings of sweet corn breeders. The total number of sweet corn breeders in the U. S. is small. Full participation in a national sweet corn meeting might be more effective than partial participation in a sectional corn conference or might supplement it.

"Two copies of the minutes of the Chicago meeting are available for inspection.

Summary of Data for Sweet Corn Hybrids Grown for Observation
in 1951 by Sweet Corn Committee of N.E. Corn Conference¹

Hybrid and Seed Source	'Plant		'Plant		'Ave.		'Ear		'Kernel	
	'Days to 50% Silk		'Hght.' 'Ins.		'vigor 'score		'yield 'length		'Ave. row No. 3	
	Me.	N.J.	Me.	Md.	Md.	Md.	N.J.	N.J.	N. J.	N. J.
Conn.										
C8xC13-1	60	43	60	5	5	4.5	6.5	8-12-14	2-3	
C12XC13-1	63	44	58	5	5	4.5	6.4	10-12-16	2-3	
CA13bDaxC13-1	63	47	49	5	5	4.5	6.6	8-12-12	1-3	
C69x3 ² -2Argx										
C13-1	58	42	57	5	5	4.5	6.3	10-12-14	2-3	
Md.										
Exp. No. 1	73	56	90	3.5	3	3.3	8.8	10-12-12	1.5-1.5	
(S.CsMd 533-1)										
N. Jersey										
Exp. Hyb. 101	68	52	89	3	1	2.8	8.5	12-12-16	1.5-1.5	
" " 102	71	55	86	3.5	2	3.0	8.3	12-12-16	1.5-1.5	
" " 103	70	53	85	3.5	3	3.5	8.3	12-12-16	1.5-2	
" " 104	68	52	90	3.5	2	3.5	9.2	12-12-16	2-2	
" " 105	66	48	76	3.5	2	3.5	8.2	12-12-16	2-2.5	
" " 106	63	47	73	4.5	2	3.0	8.6	10-12-14	1.5-2.5	
" " 107	66	49	82	4.5	2	3.8	8.0	10-12-16	2-2	
Reference Hyb.										
Golden Cross B. 76	56	88	3	1		2.5	8.6	10-12-12	1.5-1.5	
(F.H.W.)										

¹ Data reported by Maine, Maryland and New Jersey. Good season for New Jersey. Very dry season for Maryland where yields were very low and much wilt was present. Planting dates: N.J., June 18; Md., June 22.

² Flavor score on left. Texture score on right. 1, most desirable; 3, least desirable.

³ From left to right: Low variant, modal class, and high variant.

* Score 1 to 5 with 1 being most desirable.

"The Chairman of the Sweet Corn Committee of the Northeastern Corn Improvement Conference should express the appreciation of his committee for the invitation, and also express the interest of members of the Northeastern Sweet Corn Committee in attending a joint meeting with the North Central Committee next year."

R. G. Rothgeb, Chairman

After a brief discussion of the report it was

MOVED: That the report be accepted.

Seconded and passed.

Report of the Nominating Committee

The nominating committee consisting of R. S. Snell, L. I. Huber and R. G. Rothgeb suggested H. M. Yegian as President for the ensuing year and H. L. Everett as Vice President.

Drs. Yegian and Everett were unanimously elected.

C. C. Wernham brought up the question of selection for cold resistance in sweet corn. There was considerable discussion of the place of cold testing in a breeding program and of the amount of protection afforded by seed treatment. Dr. Wernham felt that considerable advantage was to be gained from screening sweet corn inbred lines for cold tolerance and that it should be a part of every sweet corn breeding program.

Dr. J. L. Cartledge

During the morning session the conference was informed that Dr. J. L. Cartledge had succumbed to a heart attack during the previous night. A committee consisting of R. G. Wiggans, R. G. Rothgeb and R. S. Snell was asked to prepare an expression of sympathy to be forwarded to Dr. Cartledge's family and to the Agronomy Department at the University of West Virginia. This resolution is as follows:

Resolutions following the death of Dr. J. L. Cartledge

"The members of the Northeast Corn Conference, individually and collectively assembled in conference wish to express our deep sorrow caused by the death of our personal friend and associate

Dr. J. L. Cartledge, Professor of Genetics, University of West Virginia, whose contributions to the conference have been always friendly, thoughtful, and continuous and whose contributions in the field of research in which he served have been outstanding. The special esteem in which Dr. Cartledge was held by his associates is expressed in his election at this meeting to the chairmanship of their Conference.

Be it resolved that this expression of deepest sympathies be sent to the family of Dr. Cartledge and to the Department of Agronomy at the University of West Virginia and that it be made a part of the permanent record of the Conference.

R. W. Wiggans,
Chairman of the Conference"

Meeting adjourned at 12 noon.

ROSTER OF ATTENDANCE

Connecticut

Jones, D. F.	Connecticut Agric. Expt. Station	New Haven
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Delaware

Collins, F. Burton	Delaware Agric. Expt. Station	Newark
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Maine

Bailey, R. M.	Maine Agricultural Expt. Station	Orono
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Maryland

Rothgeb, R. G.	Maryland Agric. Expt. Station	College Park
W. R. Findley	Plant Industry Station	Beltsville
M. T. Jenkins	" " "	"

Massachusetts

Yegian, Hrant M.	Massachusetts Agric. Expt. Station	Amherst
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New Hampshire

Dunn, Gerald M.	New Hampshire Agric. Expt. Station	Durham
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New Jersey

Snell, Robert S.	New Jersey Agric. Expt. Station	New Brunswick
Stults, Clifford C.	" " " " "	" "

New York

Barton, D. W.	New York Agric. Expt. Station	Geneva
Wiggans, R. G.	Cornell University Agric. Expt. Station	Ithaca
Everett, H. L.	" " " " "	"
Matthews, David L.	Brookhaven Nat'l. Laboratory	Upton, L.I.
Singleton, W. Ralph	" " "	"

Ohio

Stringfield, G. H.	Ohio Agricultural Expt. Station	Wooster
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Pennsylvania

Wernham, Cliff C.	Pennsylvania Agric. Expt. Station	State College
Huber, L. L.	" " " "	" "
Bellairs, Drew E.	" " "	" "

West Virginia

Cartledge, J. L.	West Virginia Agric. Expt. Station	Morgantown
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OFFICERS AND COMMITTEE MEMBERSHIP, 1952

Referee - A. J. Heinicke

Executive Committee

Chairman	H. M. Yegian
Vice Chairman	H. L. Everett
Member-at-large	R. G. Wiggans
Secretary	M. T. Jenkins

Committee on Uniform Tests of Double Crosses

L. L. Huber, Chairman
B. F. Coon
H. L. Everett
C. M. Haenseler
R. S. Wiggans

Committee on the Registration of "Eastland" Hybrids

D. F. Jones, Chairman
L. L. Huber
R. G. Rothgeb

Committee on Sweet Corn Investigations

R. G. Rothgeb, Chairman
R. M. Bailey
D. W. Barton
W. H. Lachman
M. T. Lewis
W. R. Singleton
R. S. Snell

Committee on Statistical Designs for the Uniform Comparisons

C. E. Phillips, Chairman
C. I. Bliss
H. M. Yegian

Committee on Cold Tests

C. C. Wernham, Chairman
H. L. Everett

Committee on Uniform Tests of Field Corn Inbreds

L. L. Huber, Chairman
C. M. Haenseler
R. G. Wiggans

Committee on Uniform tests of Single Crosses

W240 Maturity - H. M. Yegian, Chairman
R. M. Bailey

W355, W412 and
M15 maturities - L. L. Huber, Chairman
R. G. Wiggans
H. M. Yegian

K24 and Ia.4059
maturities - D. F. Jones

U. S. 13 and Ill. 448
maturities - J. C. Anderson, Chairman
R. G. Rothgeb

LIST OF NORTHEASTERN EXPERIMENT STATIONS

Connecticut
Delaware
Maine
Massachusetts
Maryland
New Hampshire

New Jersey
New York
Pennsylvania
Rhode Island
Vermont
West Virginia

THE UNIVERSITY OF CHICAGO

DEPARTMENT OF CHEMISTRY

REPORT ON THE PROGRESS OF WORK

FOR THE YEAR 1900

BY

JOHN EDGAR HILL

AND

WILLIAM B. HARRIS

CHICAGO, ILL., 1901

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